In the Claims

1. (Withdrawn) A current sensor comprising:

a first Hall effect sensor and a second Hall effect sensor constructed to provide feedback indicating current flow through a conductor susceptible to external magnetic flux;

a housing configured to position the first Hall effect sensor and the second Hall effect sensor about the conductor to provide generally magnitude equal feedback of the current flow through the conductor and generally polarity opposite feedback of the external magnetic flux; and

further comprising a printed circuit (PC) board having a pair of PC board fingers configured to receive the first Hall effect sensor and the second Hall effect sensor.

2. (Withdrawn) The current sensor of claim 1 further comprising a processing component configured to receive the feedback from the first and second Hall effect sensors and generate an anti-differential output having reduced influence from magnetic fields induced externally from the conductor.

3. (Withdrawn) The current sensor of claim 2 further comprising a data port disposed within the housing and configured to communicate the anti-differential output for current monitoring.

4. (Withdrawn) The current sensor of claim 2 wherein the processing component includes at least one of a summing amplifier and a differential amplifier and wherein the anti-differential output is generated by calculating a polarity respecting sum of the feedback from the first and second Hall effect sensors.

5. (Withdrawn) The current sensor of claim 2 further comprising a constant current power supply having at least one of a bias current compensation circuit and a temperature dependent adjustable gain configured to compensate for Hall gain drift.

6. (Withdrawn) The current sensor of claim 2 wherein the processing component includes a temperature dependant op-amp gain loop configured to compensate for temperature dependent electronic drift.

7. (Withdrawn) The current sensor of claim 1 wherein the PC board includes at least one of a communications interface, a circuit breaker, a state indicator, and a display integrated thereon and wherein the first and second Hall effect sensors are arranged on the PC board to communicate feedback to at least one of the communications interface, the circuit breaker, the state indicator, and the display.

8. (Withdrawn) The current sensor of claim 7 wherein the communications interface includes at least one of a wireless communications interface, a power-line encoded communications interface, and a cable communications interface.

9. (Withdrawn) The current sensor of claim 7 further comprising a plurality of windings configured to receive current flow from the conductor and concentrate magnetic flux induced by current flow through the plurality of windings.

10. (Withdrawn) The current sensor of claim 1 wherein the first and second Hall effect sensors are configured to be mounted on respective PC board fingers.

11. (Withdrawn) The current sensor of claim 10 wherein at least a portion of the plurality of windings are configured to encircle each PC board finger and a respective Hall effect sensor.

12. (Withdrawn) The current sensor of claim 10 wherein the plurality of windings include a first directional winding and a second directional winding and wherein the first directional winding and the second directional winding are configured to spiral in substantially opposite directions.

13. (Withdrawn) The current sensor of claim 9 wherein the housing is further configured to receive and secure the PC board, the first and second Hall effect sensors, a processing component, and a plurality of windings in an anti-differential topology.

14-16. (Canceled)

17. (Withdrawn) The current sensor of claim 1 further comprising a circuit breaker control circuit mounted to the PC board.

18. (Withdrawn) The current sensor of claim 1 further comprising a detector component mounted to the PC board, wherein the detector component is configured to determine at least one of an alternating current (AC) fault and a direct current (DC) fault.

19. (Canceled)

20. (Withdrawn) The current sensor of claim 1 further comprising an auto-scale circuit configured to provide enhanced resolution over a given user-selectable operation range.

21. (Previously Presented) A current sensor comprising:

a PC board configured to receive a plurality of components;

a conductive path disposed proximate to the PC board;

a first Hall effect sensor and a second Hall effect sensor, each configured to be mounted to the PC board and adjacent the conductive path to provide feedback indicating a current flow through the conductive path;

a processing component configured to receive the feedback from the first Hall effect sensor and the second Hall effect sensor and calculate an anti-differential output from the feedback that substantially removes feedback in response to magnetic flux induced externally from the conductive path and

wherein the conductive path includes at least one spiraled portion configured to encircle at least a portion of the PC board.

22. (Original) The current sensor of claim 21 wherein the PC board includes a first arm and a second arm and wherein the first Hall effect sensor is configured to be mounted to the first arm and the second Hall effect sensor is configured to be mounted to the second arm.

23. (Original) The current sensor of claim 22 wherein the first arm and the second arm each include an air gap configured to receive one of the first Hall effect sensor and second Hall effect sensor.

24. (Withdrawn) The current sensor of claim 22 wherein the at least one spiraled portion includes a first spiraled portion encircling the first arm and a second spiraled portion encircling the second arm.

25. (Withdrawn) The current sensor of claim 24 wherein the first spiraled portion is spiraled in a first direction to direct magnetic flux induced by current flow through the first spiraled portion in the first direction and the second spiraled portion is spiraled in a second direction to direct magnetic flux induced by current flow through the second spiraled portion in the second direction.

26. (Withdrawn) The current sensor of claim 25 wherein the first direction is substantially opposite in direction to the second direction.

27. (Withdrawn) The current sensor of claim 26 wherein the first spiraled portion and the second spiraled portion are configured in one of a dual-helix configuration and a quad-helix configuration.

28. (Withdrawn) The current sensor of claim 21 further comprising a housing configured to receive and arrange the PC board, the first Hall effect sensor, the second Hall effect sensor, the processing component, and at least a portion of the conductive path in an anti-differential current sensing topology.

29. (Original) The current sensor of claim 21 further comprising a communications interface configured to output a current signal indicative of current flow through the conductive path.

30. (Original) The current sensor of claim 21 further comprising an input terminal configured to supply current flow to the conductive path and an output terminal configured to release current flow from the conductive path.

31. (Original) The current sensor of claim 21 wherein the anti-differential output is generated by calculated at least one of a sum and a difference of the feedback from the first and the second Hall effect sensors.

32. (Withdrawn) A current sensing system comprising:
a conductor configured to conduct a current flow therethrough;
a housing configured to be mounted to the conductor;

a first Hall effect sensor configured to be fixed within the housing and to provide a first indication of current flow through the conductor;

a second Hall effect sensor configured to be fixed within the housing and to provide a second indication of current flow through the conductor;

a processing component configured to receive the first indication of current flow and the second indication of current flow and calculate at least one of a sum and a difference of the first indication of current flow and the second indication of current flow to generate an anti-differential output that reduces errors generated by magnetic fields induced thereon from sources external from the conductive path; and

an auto-scale circuit configured adjust a bias current supplied to the first Hall effect sensor and the second Hall effect sensor to provide enhanced resolution over a given user-selectable operation range.

33. (Withdrawn) The current sensor of claim 32 wherein the anti-differential output is substantially free of indications of current flow provided by the first Hall effect sensor and the second Hall effect sensor responsive to magnetic flux induced externally from current flow through the conductive path.

34. (Withdrawn) The current sensor of claim 33 further comprising a data port configured to be fixed within the housing to communicate the at least one of a sum and a difference of the first indication of current flow and the second indication of current flow externally from the housing.

35. (Withdrawn) The current sensor of claim 34 wherein the data port is further configured to communicate with a communications interface including at least one of a wireless communications interface, a power-line encoded communications interface, and a cable communications interface

36-37. (Canceled)

38. (Withdrawn) The current sensor of claim 32 wherein the processing component includes at least one of a summing amplifier and a differential amplifier.

39. (Withdrawn) The current sensor of claim 32 wherein the PC board has at least a first arm configured to receive the first Hall effect sensor and a second arm configured to receive the second Hall effect sensor.